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PROCEDURE
POTTING ELECTRICAL CABLE ASSEMBLY TERMINATIONS

LABORATORY BRANCH
MEASUREMENT SYSTEMS DIVISION

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PROCEDURE
POTTING ELECTRICAL CABLE ASSEMBLY TERMINATIONS

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LABORATORY BRANCH
MEASUREMENT SYSTEMS DIVISION

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SECTION I INTRODUCTION

1.1 PURPOSE

The methods detailed in this procedure are to be used by the Laboratory Branch, IN-MSD-2, contractor personnel in cleaning and potting cables in the Electronic Prototype Laboratory, Potting Laboratory.

1.2 SCOPE

The intent of this procedure is to establish methods in the preparation and potting of cable assembly terminations, consistent with, but not included in, Standard, Potting and Molding Electrical Cable Assembly Terminations, KSC-STD-132, November 22, 1965. Methods have been developed that cover cleaning, application of primers and injection of potting compound.

1.3 APPLICABLE DOCUMENTS

The following documents are applicable to the performance of this procedure and shall be considered a part of this procedure to the extent that each is referenced.

- | | |
|------------------|---|
| a. KSC-STD-132 | Standard, Potting and Molding Electrical Cable Assembly Terminations. |
| b. MSFC-SPEC-202 | Compound, Potting and Molding, Elastomeric, Specification for. |
| c. MSFC-SPEC-222 | Resin Compounds, Electrical and Environmental Insulation, Epoxy. |

SECTION II CLEANING AND POTTING OPERATIONS

2.1 GENERAL

All cable cleaning will be performed in an exhaust hood with fans running. The cable assembly terminations shall be held rigid and in proper alignment in a holding rack inside the exhaust hood.

WARNING

Continued exposure to Methyl-Ethyl-Ketone (MEK) may cause severe physiological reactions. Reference KSC-STD-132, paragraph 6.4.5.

2.2 DEFINITIONS

- a. Wet: Immersion of applicator (gauze pad) in MEK, removal and squeezing to reduce wetness.
- b. Soak: Immersion of applicator in MEK.
- c. Saturate: Immersion of applicator in MEK, removing, turning over and immersing again.
- d. Stroke: Wiping of component surface in one direction, one time.

2.3 PROCEDURE

NOTE

The methods, as outlined herein, shall also be applied to the potting of samples from cables being used with each new batch of potting compound to determine the effectiveness of adhesion. After curing, samples shall be released to QA for acceptability before proceeding. It shall also be necessary at this time to prepare a hardness test sample in accordance with KSC-STD-132, paragraph 6.7.2(d). Potting compound shall not be used after the expiration date.

2.3.1 Cleaning of Cable Assemblies. The following cleaning steps must be followed:

a. Preparation.

- (1) Separate the potting boot from connector and clean with "Q" tip soaked in MEK.
- (2) Move potting boot up and away from the connector to provide access for cleaning connector.
- (3) Secure potting boot to cable jacket.

b. Cleaning Connector.

- (1) Using a clean "Q" tip, (FSN 6515-303-8250), soaked in uncontaminated MEK, clean the insert, connector terminals, soldering, exposed wire, wire insulation, and inner body of connector that will be in contact with potting compound. Only if inaccessible with a "Q" tip, use a clean brush immersed in uncontaminated MEK for cleaning connector. Do not immerse brush in MEK container for "Q" tips - use a separate MEK container.

NOTE

"Q" tips shall be disposed of in a special container after use and shall not be reimmersed in MEK to avoid contamination of solvent cleaner.

- (2) Repeat step (1) with a clean "Q" tip or clean brush, as applicable, and uncontaminated MEK.
- (3) Use a clean dry "Q" tip to remove excess MEK.

c. Cleaning Cable Jacket.

- (1) Place a rubber glove on the hand that contacts MEK.
- (2) With the connector firmly attached, use a clean gauze pad soaked in uncontaminated MEK, to clean the cable sheath, pulling and twisting the gauze pad in a direction away from the connector. (The sheath must be cleaned thoroughly from the sheath terminus to at least one inch above the top of the potting boot. Clean the cable sheath by encircling the entire surface with gauze pad. Each stroke shall extend the entire length of the sheath surface to be cleaned.)

NOTE

The potting compound will not adhere to the cable sheath if the sheath is not clean. To insure cleanliness - do not contaminate MEK by reusing the gauze pad.

- (3) Repeat step (2) with a clean gauze pad for a final application of MEK.
- (4) Using a clean dry gauze pad quickly remove the excess MEK from the cable sheath with one stroke encircling the entire surface with a pulling and twisting motion.

NOTE

It is essential that MEK be removed before evaporation takes place to minimize MEK residue.

If the cable is polyvinyl chloride (PVC) it should be dull in appearance and tacky. Due to the tackiness, the dry gauze pad will have a tendency to stick to the sheath necessitating a firm grip when stroked.

NOTE

Step (4) appears to be a factor in effective adhesion and should therefore be accomplished quickly and carefully.

2.3.2 Application of Primer.

- a. Pour a small amount of primer, N5E-096 (single component) into a clean container. Immediately after each cable jacket has been cleaned and while cable jacket is still tacky, immerse an ox-ear hair brush, 3/8" width, (FSN 8020-224-8006) in primer and apply one thin coat over the entire cleaned surface. Use the same brush in applying primer to cable jackets. Clean as necessary in uncontaminated MEK. Do not immerse brush in the can or bottle of primer.

NOTE

It is imperative that primer completely covers cleaned surface of cable jacket.

- b. Air dry for 30 minutes minimum.
- c. Application of MEK.
 - (1) If primer was a heavy consistency when applied, wipe the primed surface lightly only once in one direction with a wet gauze pad.
 - (2) If primer was a watery consistency when applied, the additional application of MEK will not be required.
- d. Visually check and insure that primer envelops the cleaned surface of cable jacket. Any voids will require further application of primer N5E-096 over these areas.
- e. Clean and retain brush for future use.
- f. Dispose of primer remaining in container.

2.3.3 Potting of Cable Assemblies. After the primer has been applied, it is imperative that the following notes be observed before proceeding with the potting of cable assemblies as delineated.

NOTE

The polyurethane must be thawed for 30 minutes at $120^{\circ}\text{F} \pm 9^{\circ}\text{F}$ prior to potting. The end of the thawing interval should coincide with the end of the required 30 minute pre-heating interval with the primer applied.

All solder cups on the connector must be full to reduce the possibility of air bubbles appearing in the potting compound after curing.

After the cables have been cleaned, they must be checked to assure that the cable is in the proper position for potting.

- a. Slide potting boot down to, but not over, the cleaned sheath surface. Visually inspect the inside of the potting boot for contamination. If necessary, re-clean with a clean "Q" tip soaked in uncontaminated MEK. Dry with a clean "Q" tip.

- b. Place the potting boot on the connector.
- c. Secure the cable assembly termination with the proper clamps in the potting curing oven and start to heat the cable assemblies for 30 minutes with the temperature control set at $179.6^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$ (variation of potting curing oven temperature $\pm 18^{\circ}\text{F}$). At this time, place a tube of frozen potting compound into the thawing block and heat at $120^{\circ}\text{F} \pm 9^{\circ}\text{F}$ for 30 minutes in the thawing oven.
- d. After the potting compound has thawed for the required 30 minutes, remove the tube of potting compound from the thawing block in the thawing oven. Bleed off any air trapped in the tube of potting compound by inserting a cable tie (cleaned with MEK) between plunger and wall of tube (potting compound) while also pressing against the plunger. Insert tube of potting compound in the injection gun, then remove the cap, screw the nozzle on and extract a small quantity of potting compound to eliminate bubbles.
- e. Open the oven door and if necessary, turn the potting curing oven off. Inject the potting compound through the drilled hole in the potting boots. (Set the injection gun air pressure at approximately 7 psi.)

NOTE

Maintain a constant flow of compound into the boot, unless it becomes necessary to remove the injection gun to eliminate bubbles in the tube of potting compound.

After the boot is filled to the desired level, approximately three quarters full (above the sheath terminus), remove the injection gun and immediately cover the hole in the side of the boot with Tuck Tape Type 90T or equal.

- f. Close the potting curing oven door, turn the oven on (if turned off in step e) and start curing the potting compound injected in the potting boots with the temperature set as indicated in step c.
- g. After approximately 10 minutes, open the potting curing oven door. Observe if air bubbles have appeared in the potting compound injected in the potting boots. Eliminate any bubbles with a straightened paper clip thoroughly cleaned with MEK. Continue to observe for any formation of air bubbles in the potting compound intermittently thereafter and eliminate accordingly.

All bubbles in the potting compound must be eliminated during this interval. After bubbles are eliminated, close the potting curing oven door.

- h. Immediately after completing step g, place another tube of potting compound in the thawing block and heat at $120^{\circ}\text{F} \pm 9^{\circ}\text{F}$ for 30 minutes in the thawing oven.
- i. Remove the tube of potting compound from the thawing block in the thawing oven, bleed off any air trapped in the tube of potting compound by inserting a cable tie (cleaned with MEK) between plunger and wall of tube (potting compound) while also pressing against the plunger. Insert tube of potting compound in the injection gun, then remove the cap, screw the nozzle on and extract a small quantity of potting compound to eliminate bubbles.
- j. Open the potting curing oven door, fill the potting boot to the required level through the top hole.
- k. Eliminate air bubbles as indicated in step g and "top off" when required. Upon eliminating air bubbles and "topping off", close potting curing oven door.
- l. Cure for 16 hours with temperature set as indicated in step c.
- m. After the curing time has elapsed, turn the potting curing oven off.

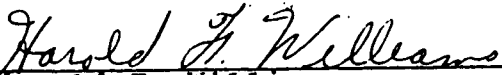
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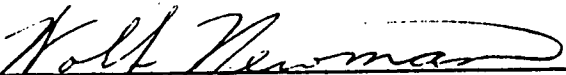
Leave all cable assemblies in the potting curing oven for a minimum of 30 minutes for temperature equilibrium.

- n. Remove the cable assemblies from the potting curing oven and prepare for submittal to QA.


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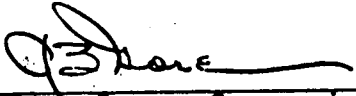
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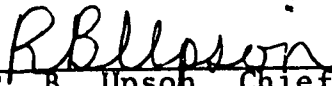
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